



## Clinical and Diagnostic Significance of Signs of Systemic Inflammatory Response Syndrome and Cytokine Levels in Patients with Purulent Rhinosinusitis

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**Abstract:** Upper respiratory tract infections are considered the most common diseases of childhood and account for about 80-90% of all respiratory tract infections. Preschool children suffer 5-7 infections of the upper respiratory tract per year. The primary goal of treatment for rhinosinusitis is to restore secretion drainage and ventilation of the paranasal sinuses. Decongestant nasal drops, which are often used for sinusitis, although effective in treating the symptoms of stuffy nose, but to date, their effectiveness in sinusitis has not been proven. Therefore, the herbal preparation Sinupret®, which is indicated for the treatment of acute and chronic rhinosinusitis in children and adults, deserves special attention. In our study, we analyzed the results of treatment of 310 children of preschool and school age with characteristic symptoms of rhinosinusitis. The effectiveness of the treatment of acute rhinosinusitis in children with Sinupret® was rated as "very high". The presented studies, based on practical experience, confirm the efficacy and good tolerability of Sinupret®.

**Key words:** fertile age, metabolic syndrome.

**Relevance.** Upper respiratory tract infections are considered the most common diseases of childhood and account for about 80-90% of all respiratory tract infections. Preschool children suffer 5-7 upper respiratory tract infections per year (8;10). Throat and pharyngeal infections are among the diseases that often cause a visit to a pediatrician, general practitioner or otolaryngologist. As a rule, they are accompanied by acute rhinosinusitis. In children, this occurs more often due to the narrower anatomical dimensions of the nose and paranasal sinuses.

**Epidemiology and pathogenesis.** The most common cause of acute rhinosinusitis is a viral infection (adeno-, parainfluenza, influenza and rhinoviruses), while it is also possible

bacterial superinfection represented by such microorganisms as *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis* (1;4;18).

Various studies have shown that in patients with symptoms of rhinosinusitis with a disease duration of up to 7 days, a bacterial infection, as a rule, is not verified. During the first week, a bacterial infection is detected only in 20% of cases, and up to the fourth week - in 35% (3;5;15). The reason for this, according to Neumann, is a viral infection and a block of paranasal sinus fistulas (SNP) caused by inflammatory edema. In turn, this leads to deterioration of ventilation and drainage, stagnation of the secretion, changes in the composition of the secretion and a decrease in the pH level in the paranasal sinuses (2; 7). In children due to viral rhinosinusitis, bacterial rhinosinusitis occurs in 5-10% of cases, in adults it occurs only in 0.2-2% (6;12).

**Clinical symptoms.** There are a number of symptoms (Table 1) that indicate acute rhinosinusitis, but cannot serve as criteria for a differential diagnosis between viral and bacterial sinusitis (9;11).

Table 1. Symptoms of acute rhinosinusitis that are not diagnostically significant for the diagnosis of bacterial rhinosinusitis

<b>The presence of secretions from nasal cavity</b>	Viscous or liquid secretion, clear or mucopurulent
<b>Cough</b>	Dry or productive, during the day or at night
<b>Other symptoms</b>	Bad breath, painless periorbital edema, fever above 39°C

ER Wald (1998) in his review suggests the following criteria for establishing differential diagnosis between sharp viral And sharp bacterial rhinosinusitis :

- most uncomplicated viral rhinosinusitis lasts 5-7 days;
- acute viral rhinosinusitis may last <10 days;
- if the disease lasts 10-30 days, and despite the ongoing symptomatic therapy, there is no positive dynamics, most likely we are talking about bacterial rhinosinusitis;
- the presence of fever and purulent nasal secretion for 3-4 days also indicate a secondary bacterial infection. Children may complain of a headache in the facial part of the skull, pain around the orbits, and periorbital edema may be observed.

Table 2. Separation of patients by sex and age in a multicentric non-invasive study by ER Wald (1998)

<b>Age group</b>	<b>Girls (n=1638)</b>	<b>boys (n=1471)</b>	<b>Total (n=3109)</b>
Age group 1 (2-6 years old)	759	734	1493
Age group 2 (7-12 years old)	879	737	1616

It should be noted that in children the symptoms are less typical than in adults; in young children, the only symptom may be a cough.

**Treatment.** The primary goal of treatment for rhinosinusitis is to restore secretion drainage and ventilation of the paranasal sinuses. De-edema nasal drops that are often used for sinusitis, although effective in treating the symptoms of a stuffy nose but to date, their effectiveness in sinusitis has not been proven (13;16). Antihistamines for sinusitis are prescribed only in the presence of allergic rhinitis.

Therefore, the herbal preparation Sinupret®, which has been used in Germany since 1933 and for 40 years in other countries, deserves special attention. The drug is indicated for the treatment of acute and chronic sinusitis in children and adults. The 5 herbs it contains (Gentiana lutea, Primula veris, Rumex acetosa, Sambucus nigra, Verbena officinalis) have demonstrated a wide range of pharmacological

effects in various studies on the symptoms of rhinosinusitis (14;19). Pharmacological, toxicological and clinical studies, as well as many years of experience in its clinical use, give reason to conclude that Sinupret® is highly effective and safe in the treatment of acute rhinosinusitis in adults (17;20).

**Materials and methods.** The study was conducted in the medical centers of Bukhara (in the department of otolaryngology of the BOMC and in the private medical clinic "Bukhara LorMed Center"). In total, the results of treatment of 310 children of preschool and school age with characteristic symptoms of rhinosinusitis were analyzed. The distribution of patients by age and gender is shown in Table 2, their average age was 6.9 years.

**Table 3. Number of patients who were asymptomatic or mild at last follow-up**

Age group	Girls (n=163)	Boy and (n=147)	Severity and symptoms	Symptoms (%)			
				Difficulty in nasal breathing	Headache and facial pain	Cough	Hoarseness
Age group 1 (2-6 years old)	76	74	Missing	62.52	96.09	70.95	94.67
			Moderate	34.25	3.20	26.22	4.83
Age group 2 (7-12 years old)	87	73	Missing	63.58	92.31	73.12	94.27
			Moderate	33.53	5.95	23.32	5.07

Two-thirds of the children (64%) received an average of 20 drops of Sinupret® 3 times a day, while the dosage depended on the age of the child, the rest of the children received one tablet of Sinupret® 3 times a day.

During the treatment, the number of drops was slightly reduced. Dragees were mainly taken by older children (7-12 years old). For 10.3% of patients of the second age group (2-6 years), especially the older ones, the drops were also replaced with dragees. The primary study was conducted before the start of treatment (interval t0), the control visit (t1) was 6 days later, and the final study (t2) was 12 days later.

During the study, the dynamics of the following symptoms was documented:

- headache and pain in the face;
- nasopharyngeal secret;
- difficulty in nasal breathing;

hoarseness

A statistical analysis of the dynamics of these symptoms during treatment was carried out, as well as an overall assessment of the efficacy and tolerability of Sinupret®.

**Results and its discussion.** The most common symptoms reported at entry (t0) were nasopharyngeal secretions and difficulty in nasal breathing: virtually all children (300-310) reported more (67%) or less (33%) viscous (83%) or watery (17%) consistency of the nasopharyngeal secret, 71% described the secret as "colored" and only 29% as "colorless".

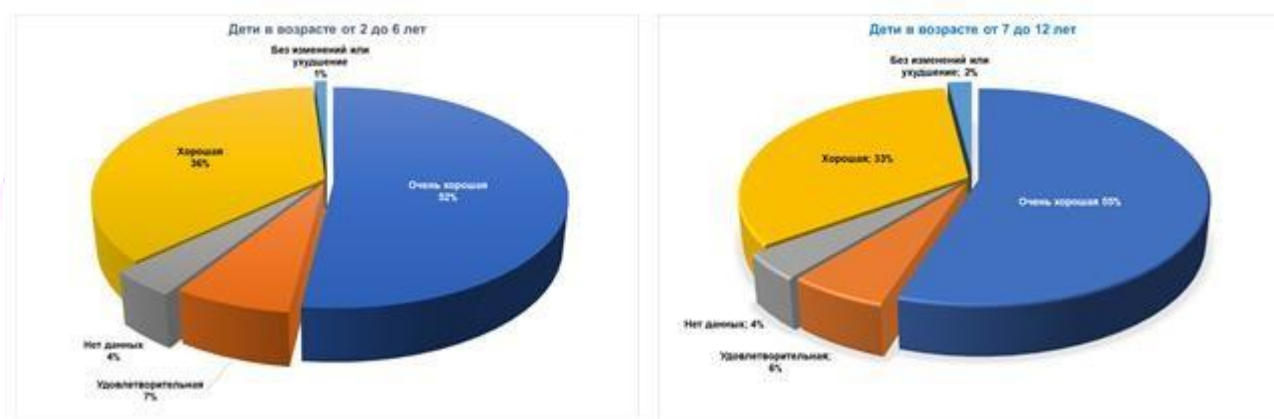
Nasal congestion occurred in almost 98% of children in both age groups. The proportion of children with a significant violation of nasal breathing in both age groups was about 40%. The second most common symptom (88%) was cough: 60% of children in the younger age group and 57% of older children complained of severe and moderate cough. 62.5% of younger and 83.5% of older children

reported headache and facial pain. About 68% of children complained of hoarseness, which in most cases was not pronounced.

At the final examination, 93% of patients reported a small amount of secretion in the nasal part of the pharynx. The consistency of the existing secret in 90% of children was watery and transparent. At the end of treatment, only 0.3% of children had a significant difficulty in nasal breathing. Less than 3% of patients had moderate nasal congestion. There was also a significant improvement in coughing: at the end of the study, 75% of the children no longer had a cough, the rest had a mild cough in most cases. Only 5% of children reported mild hoarseness. At the end of treatment, 96% of patients of the older age group and 92% of children aged 2-6 years had no headache (Table 3).

In the course of analyzing the effectiveness of Sinupret® drops and dragees on the above symptoms, there was practically no difference between the two dosage forms. In young children with pain in the throat and in the face area, the analgesic effect was more pronounced when using drops than when prescribing dragees. 74.2% of children were taking concomitant treatment at the start of the study: most often rhinological drugs (43.8%) and antibiotics (14.8%). Both in children of the younger age group and in the older group, the efficacy and tolerability of Sinupret® was assessed as

“very good” or “good” - in 88% of cases, “average” - in 7%, and only 4% had no data on effectiveness at all (Fig.).



Rice. Efficiency mark Sinupret® (drops and dragees) in different age groups

In total, 3 cases of undesirable effects (0.9%) were recorded. However, they were rated as "non-severe". Basically, it was about gastrointestinal disorders and skin rashes. In 50% of cases, the investigators attributed these events to the concomitant antibiotic treatment used or to the underlying disease.

The effectiveness of the treatment of acute rhinosinusitis in children with Sinupret® was rated as "very high". This result was achieved in both age groups (2-6 and 7-12 years) regardless of the choice of dosage form of Sinupret®. The presented studies, based on practical experience, confirm the efficacy and good tolerability of Sinupret®. Virtually no data exist on the treatment of acute rhinosinusitis, especially in children aged 2 to 6 years. In this regard, it is difficult for physicians to choose a well-tolerated and effective therapy as an alternative to antibiotic therapy for acute viral or acute bacterial rhinosinusitis.

The effectiveness of Sinupret® in relation to important symptoms such as difficulty in nasal breathing, coughing and hoarseness, was proven during all stages of the study. At the end of the study, these symptoms almost completely disappeared.

**Conclusions.** The main goal of therapy in the treatment of acute rhinosinusitis should be the restoration of ventilation and drainage for the rapid elimination of the disease and the prevention of complications. A variety of plant components of the phytopreparation have secretolytic, anti-inflammatory, antiviral and immunomodulatory effects. This makes it possible to influence not only the symptoms, but also the mechanisms of the pathogenesis of sinusitis. A wide range of pharmacological effects of Sinupret® and the presence of two dosage forms (drops and dragees) make it optimal for the treatment of rhinosinusitis in children from 2 years of age. The spectrum of recorded undesirable side effects of this drug does not differ from that in adults. The frequency of recorded side effects was below 1%. Thus,

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